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**PARISH CHEMICAL AREA
GROUNDWATER SWMU 4.5**

**LETTER REPORT OF FINDINGS
FALL 2010 GROUNDWATER MONITORING**

**Former Geneva Steel Facility
Vineyard, Utah**

January 17, 2011

Prepared For



**United States Steel Corporation
Pittsburgh, PA**

and

**ANDERSON  GENEVA
DEVELOPMENT INC**

Anderson Geneva Development, Inc

Prepared By

URS

**URS Corporation
756 East Winchester Street, Suite 400
Salt Lake City, UT 84107**

January 17, 2010

Mr Scott Anderson, Executive Secretary
Division of Solid and Hazardous Waste
Utah Department of Environmental Quality
P O Box 144880
Salt Lake City, UT 84114-4880

RE Letter Report of Findings for the Fall 2010 Groundwater Monitoring at the Parish Chemical Area, Solid Waste Management Unit (SWMU) GW-4 5 – Former Geneva Steel Facility, Vineyard, Utah

Dear Mr Anderson

United States Steel Corporation (USS) and Anderson Geneva Development, LLC/Ice Castle Retirement Fund, LLC (Anderson Geneva) are pleased to submit this Letter Report of Findings (LROF) for the Fall 2010 Groundwater Monitoring of the Parish Chemical Area, SWMU GW-4 5 at the former Geneva Steel Facility in Vineyard, Utah

The investigation was conducted in accordance with the Notification Letter submitted on August 13, 2010 to the Utah Department of Environmental Quality (UDEQ) Division of Solid and Hazardous Waste (DSHW) (USS et al , 2010a)

This LROF is organized as follows

- Section 1 summarizes previous investigations and source area knowledge
- Section 2 summarizes the groundwater sampling fieldwork undertaken in the Fall 2010
- Section 3 reviews the analytical methodology for the groundwater testing
- Section 4 reviews quality assurance (QA) and quality control (QC) procedures
- Section 5 reviews the analytical results of groundwater sampling event
- Section 6 provides a summary discussion of the implications of this work

The LROF is supported by three appendices, as follows

- Appendix A - Groundwater Sampling Logs

- Appendix B – Data Validation Report
- Appendix C - Analytical Reports with Chain of Custody Records and Data Qualifiers

1.0 BACKGROUND

1.1 Overview

An area of impacted shallow unconfined groundwater on the former Geneva Steel facility (known as the Parish Chemical Area [SWMU 4.5]) located near the southeast corner of the former Geneva Steel facility (Figure 1) has been identified from annual groundwater monitoring events performed by USS and Anderson Geneva. The impacted groundwater originates from the off-site upgradient Parish Chemical facility located at 145 North Geneva Road in Orem, Utah, immediately east of the southern portion of the former Geneva Steel facility. Piezometers and monitoring wells have been installed on the former Geneva Steel property, downgradient of the off-site Parish Chemical facility in an effort to delineate the groundwater plume.

Groundwater impacts downgradient of the off-site Parish Chemical facility were first identified after the installation of MW-124S in 1997. The initially identified impacts to groundwater were benzene and 4-chloroaniline. Additional sampling events detected these two compounds at concentrations above the approved Corrective Action Levels (CALs) for Groundwater (USS et al., 2008a). Bis(2-chloroethyl)ether (BCEE) was first detected in 1998. Concentrations have varied during the subsequent annual Perimeter-In Groundwater Monitoring Program (PGMP) event. Based on the results of the Human Health Risk Evaluation (HHRE) conducted in 2008, BCEE is the primary chemical of interest and the current risk driver for the groundwater plume from the Parish Chemical facility (USS et al., 2009a).

1.2 Previous Investigations

The Parish Chemical Area has been investigated previously with results from the previous investigations and groundwater sampling events detailed in the following documents:

- Resource Conservation and Recovery Act (RCRA) Facility Investigation Task III Facility and Reports Part Four PGMP Implementation Report (CH2M Hill, 1998)
- PGMP report for 1999 (CH2M HILL, 2000a)
- PGMP report for 2000 (CH2M HILL, 2000b)
- PGMP report for 2003 (CH2M HILL, 2003)

- PGMP report for August 2004 (USS et al , 2005a)
- PGMP report for December 2004 (USS et al , 2005b)
- PGMP report for 2005 (USS et al , 2006)
- 2006 Maintenance Yard and Parish Chemical Groundwater Investigation (URS, 2006)
- PGMP report for 2006 (USS et al , 2007)
- PGMP report for 2007 (USS et al , 2008b)
- LROF for the 2007 Facility-Wide Groundwater Investigation (FWGI) (USS et al , 2008c)
- PGMP report for 2008 (USS et al , 2009b)
- LROF for the 2008 FWGI (USS et al , 2009c)
- Status Letter for the 2008 Soil-Gas Sampling Pilot Study Results and Human Health Risk Assessment (USS et al , 2009d)
- Status Letter for the Source Investigation at the Parish Chemical Facility (USS et al , 2009e)
- Revised Tier 2 Human Health Risk Evaluation for Parcel South of 400 North (USS et al , 2009a)
- Status Letter for the Investigation of Groundwater Impacts Downgradient of the Parish Chemical Facility (USS et al , 2009i)
- PGMP report for 2009 (USS et al , 2010b)
- PGMP report for 2010 (USS et al , in preparation)

1.3 Source Area

The source of the impacts to groundwater at the Parish Chemical Area was determined to be from activities at the off-site Parish Chemical Facility located upgradient of the former Geneva Steel facility (USS et al , 2009d)

2.0 2010 GROUNDWATER SAMPLING EVENT

A groundwater sampling event was conducted in the Fall of 2010 to evaluate impacts to groundwater underlying the Parish Chemical area of the former Geneva Steel Facility. Groundwater sampling was conducted on September 14 and 15, 2010 at 10 temporary piezometers located within the Parish Chemical Area (GPW-0180, PC-205, PC-206, PC-210, PC-213, PC-219, PC-223, PC-228, PC-229A, and PC-230, Figure 1)

Additionally, groundwater sampling was conducted from PGMP wells MW-101S and MW-124S, located within the Parish Chemical Area, on September 13, 2010 as part of the PGMP. A complete assessment and description of the 2010 PGMP results will be presented in the *Perimeter-In Groundwater Monitoring Program Groundwater Conditions Report for Fall 2010* (USS et al, 2011). However, the analytical and field results for MW-101S and MW-124S are included in this report also due to their proximity to the Parish Chemical Area. Groundwater sampling logs from the September 14 and 15, 2010 groundwater sampling event are included as Appendix A.

Groundwater sampling was conducted in accordance with applicable standard operating procedures (SOPs) contained in the revised Verification Investigation Work Plan (VIWP) (USS et al 2005a). Groundwater conditions were evaluated by measuring temperature, dissolved oxygen (DO), pH, conductivity, and oxidation/reduction potential (ORP) immediately before sample collection. The depth to water and the total depth of the monitoring wells and piezometer were measured and recorded prior to sampling. The recorded field parameters are listed in Table 1 and are shown on the groundwater sampling logs attached as Appendix A.

3.0 ANALYTICAL METHODOLOGIES

U.S. Environmental Protection Agency (EPA) approved test methods were used for groundwater samples collected from piezometers and monitoring wells during the Fall 2010 Parish Chemical Area groundwater sampling event. All groundwater samples were analyzed by Test America Laboratories, Inc. of Arvada, Colorado, a Utah-certified laboratory.

Specific analytical suites utilized for groundwater samples were based on the findings of previous groundwater sampling events conducted at the Parish Chemical Area (see Section 1.2). Analytical suites and methods used to test Parish Chemical Area groundwater samples are listed below.

For all piezometers and monitoring wells:

- Semi-volatile organic compounds, full suite, by EPA SW846 Test Method 8270B (extraction/preparation method SW846 5030B/8270) or equivalent method.

For piezometer PC-213 and monitoring wells MW-100S and MW-124S:

- Volatile organic compounds, full suite, which includes benzene, toluene, ethylbenzene, xylenes, and naphthalene (BTEXN), by EPA SW846 Test Method 8260B (extraction/preparation method SW846 5030B/8260) or equivalent method.

For monitoring well MW-124S

- Ammonia as nitrogen (N) by EPA Test Methods for Chemical Analysis of Water and Wastes (MCAWW) 350 1 or equivalent method

4.0 QUALITY ASSURANCE/QUALITY CONTROL

4.1 Field Controls

In accordance with the revised DCQAP (URS, 2004), field quality control (QC) samples were collected and submitted for laboratory analyses

For the 2010 Parish Chemical area groundwater sampling event, the QC samples were as follows

- One (1) duplicate sample (based on the frequency of one duplicate sample per 10 normal samples) was collected from PC-213
- One (1) field blank (based on the frequency of one per 20 normal samples)
- One (1) trip blank (one per cooler)
- One (1) matrix spike/matrix spike duplicate (MS/MSD) sample (based on the frequency of one per 20 normal samples)

Additionally, QA/QC samples were collected from MW-124S as part of the Fall 2010 PGMP groundwater sampling event. Details of the PGMP sampling event including the specifics of the QA/QC samples

4.2 Laboratory Controls

Laboratory QA/QC measures and analytical methods are given in the DCQAP (URS, 2004)

4.3 Data Validation

The analytical results were validated by a URS chemist in accordance with the revised DCQAP (URS, 2004). Data Validation Reports are included in Appendix B of this report

All analytical results from the Fall 2010 Parish Chemical Area groundwater sampling event met Site data quality objectives and requirements for precision, accuracy, representativeness, completeness, comparability, and sensitivity

Groundwater samples collected as part of the 2010 PGMP in the Parish Chemical Plant Area met the groundwater investigation Site data quality objectives and are considered usable, as qualified with the appropriate data validation flags, with the exception of rejected hexachlorocyclopentadiene and 3 & 4 methylphenol results for all samples reported as non-detect

5.0 RESULTS OF 2010 GROUNDWATER SAMPLING EVENT

5.1 Water Level Measurements/Hydraulic Gradient

The depth to water in the shallow unconfined aquifer was measured in wells and piezometers Site-wide on September 7, 2010 prior to the Parish Chemical area sampling event. The depth to groundwater in the shallow unconfined aquifer beneath the Parish Chemical Area ranges from 7.83 to 15.31 feet below top of casing (BTOC). These water level measurements were used to make the Site-wide and SWMU specific potentiometric contours shown on Figure 1. Groundwater flow direction within the shallow unconfined aquifer is generally east to west for the former Geneva Steel facility and to the southwest underlying the Parish Chemical Area (Figure 1).

Horizontal hydraulic gradients calculated for the shallow unconfined aquifer as part of the 2010 PGMP are very similar to previous rounds collected in 2006, 2007, 2008, and 2009 (USS et al., 2007, 2008b, 2009c, 2010b). The Site-wide average horizontal gradient is approximately 0.007 feet/foot. The local horizontal hydraulic gradient underlying the Parish Chemical Area is approximately 0.012 feet/foot.

5.2 Analytical Results

The primary constituent impacting groundwater in the Parish Chemical Area is BCEE. BCEE was detected at a concentration of 13 mg/L in both the normal and field duplicate samples collected from monitoring well MW-124S on the eastern perimeter of the Site. Due to the anomalous BCEE result (13 mg/L in 2010 versus 1.3 mg/L in 2009), MW-124S was resampled on October 28, 2010. The resampling of MW-124S yielded an equally anomalous BCEE result, 34 mg/L. These levels are attributable to the off-Site Parish Chemical Facility. This maximum dissolved concentration was observed immediately west of the upgradient off-site Parish Chemical Facility.

All analytical results are shown in Table 2. Analytical Reports with Data Qualifiers and Chain of Custody Records are included in Appendix C.

6 0 DISCUSSION AND CONCLUSIONS

The following points are the major findings of the Parish Chemical Area groundwater monitoring event

- BCEE impacts have been largely delineated by piezometers and monitoring wells
- The BCEE impacts show declining concentrations in the downgradient and central portions of the plume
- BCEE impacts to groundwater can definitively be attributed to the upgradient off-site Parish Chemical Facility

Please contact us at your convenience if you have any questions regarding this report or other matters

cc T Maniatis, URS
File AG, USS

7.0 REFERENCES

- CH2M HILL, 1998 RCRA Facility Investigation, Task III Facility Investigation and Reports, Part Four, Perimeter-In Groundwater Monitoring Program Implementation Report April 1998
- CH2M HILL, 2000a RCRA Facility Investigation, Task III Facility Investigation and Reports, Part Four, Perimeter-In Groundwater Monitoring Program 1999, Annual Groundwater Conditions Report, June 1998 to June 1999 January 2000
- CH2M HILL, 2000b RCRA Facility Investigation, Task III Facility Investigation and Reports, Part Four, Perimeter-In Groundwater Monitoring Program, Groundwater Conditions Report for July 2000 October 2000
- CH2M HILL, 2003 RCRA Facility Investigation, Task III Facility Investigation and Reports, Part Four, Perimeter-In Groundwater Monitoring Program, Groundwater Conditions Report for June 2003 December 2003
- URS, 2004 Final RCRA Facility Investigation Work Plan Task II Data Collection and Quality Assurance Plan (DCQAP) EPA/UTD 009 086 133
- USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2005c Perimeter-In Groundwater Monitoring Program, Groundwater Conditions Report for August 2004 January 2005
- USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2005b Perimeter-In Groundwater Monitoring Program, Groundwater Conditions Report for December 2004 July 2005
- USS, Geneva LLC, URS, and Peer Consultants, 2005a Revised Final RCRA Facility Investigation Task III, Part 4 Verification Investigation Work Plan EPA/UTD 009 086 133
- USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2006 Perimeter-In Groundwater Monitoring Program, Groundwater Conditions Report for August 2005 January 2006
- USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2007 Perimeter-In Groundwater Monitoring Program Groundwater Conditions Report for August 2006 Geneva Steel Facility January 2007
- USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2008a Groundwater Corrective Action Levels, Former Geneva Steel Facility April, 2008 EPA/UTD 009 086 133

USS and Geneva Steel LLC, 2008b Perimeter-In Groundwater Monitoring Program Groundwater Conditions Report for August 2007 Geneva Steel Facility January 2008

USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2008c Letter Report of Findings for the 2007 Facility-Wide Groundwater Investigation Geneva Steel Facility March, 2008

USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2009a Revised Tier 2 Human Health Risk Evaluation for Parcel South of 400 North – Geneva Steel Facility January, 2009

USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2009b Perimeter-In Groundwater Monitoring Program, Groundwater Conditions Report for August 2008 Geneva Steel Facility January, 2009

USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2009c Letter Report of Findings for the 2008 Facility-Wide Groundwater Investigation Geneva Steel Facility April, 2009

USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2009d Soil-Gas Sampling Pilot Study Results and Human Health Risk Assessment Status Letter May 12, 2009

USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2009e Status Letter for the Source Investigation at the Parish Chemical Facility – Orem, Utah

USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2009f Status Letter for the Investigation of Groundwater Impacts Downgradient of the Parish Chemical Facility – Orem, Utah October, 2009

USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2010a Notification Letter for Groundwater Monitoring Event at the Parish Chemical Area Impacts (SWMU GW-4 5) - Former Geneva Steel Facility, Vineyard, Utah August 2010 EPA/UTD 009 086 133

USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, 2010b Perimeter-In Groundwater Monitoring Program, Groundwater Conditions Report for October 2009 February, 2010

USS and Anderson Geneva, LLC/Ice Castle Retirement Fund, LLC, (2011) Perimeter-In Groundwater Monitoring Program, Groundwater Conditions Report for Fall 2010 January, 2011

URS, 2006 Maintenance Yard and Parish Chemical Area Groundwater Investigation Report January and April 2006 Geneva Steel Facility November, 2006

Table 1 Summary of Groundwater Field Parameter Measurements

Table 2. Groundwater Sample Results Exceeding CALs

Figure 1. Location / Potentiometric Surface Contour Map

Figure 2 Bis(2-chloroethyl)ether Concentrations in Groundwater

Appendix A Groundwater Sampling Logs

Appendix B Data Validation Report

Appendix C Laboratory Analytical Reports with Chain of Custody Records and Data Qualifiers *(included in electronic format only)*

ACKNOWLEDGEMENT

As authorized representatives for United States Steel Corporation and Anderson Geneva Development LLC/Ice Castle Retirement LLC, we the undersigned approve this document for submittal to the Utah Department of Environmental Quality

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and, that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are penalties for submitting false information, including the possibility of fine and imprisonment."



Mark Rupnow, Manager
Environmental Affairs
United States Steel Corp



Russell Christensen
Director of Environment
Anderson Geneva Development, Inc

January 17, 2011
Date

Tables

Table 1
Summary of Groundwater Field Parameter Measurements
Parish Chemical Area Groundwater Monitoring - Fall 2010

LocationID	Date Sampled	Top of Casing Elev (ft amsl)	Depth to Water B T O C (ft)	Groundwater Elev (ft amsl)	Total Depth B T O C (ft)	Calculated Purge Volume (gallons)	Actual Purge Volume (gallons)	Fmal pH (standard units)	Final Specific Conductance (mS/cm)	Final Temperature (°C)	Redox (mV)	Dissolved Oxygen (mg/L)
GPW-0180	9/15/2010	4554 10	10 65	4543 45	17 68	0 9	1 0	7 38	1 36	18 81	-61	0 63
MW-100S	9/13/2010	4542 80	10 20	4532 60	17 18	3 4	3 5	7 63	1 33	20 67	70	2
MW-124S	9/13/2010	4553 14	7 83	4545 31	16 99	4 5	4 5	7 61	1 33	20 2	30	2 1
MW-124S	10/28/2010	4553 14	7 73	4545 41	15 99	4 0	4 5	7 49	1 32	17 18	30	0 46
PC-205	9/15/2010	4552 14	9 85	4542 29	17 52	0 9	1 0	7 36	1 02	19 73	-30	0 61
PC-206	9/15/2010	4552 47	12 58	4539 89	18 30	0 7	0 8	7 42	1 04	18 99	-10	1 37
PC-210	9/15/2010	4547 06	10 60	4536 46	17 85	0 9	1 0	7 44	1 43	18 69	-4	0 95
PC-213	9/15/2010	4554 36	8 08	4546 28	16 65	1 1	1 1	7 20	1 33	18 30	-162	0 59
PC-219	9/14/2010	4552 12	12 74	4539 38	19 10	0 8	0 8	7 64	1 40	19 28	30	0 7
PC-223	9/14/2010	4550 44	12 75	4537 69	13 92	0 1	0 2	7 42	1 59	22 51	28	2 73
PC-228	9/15/2010	4550 69	15 31	4535 38	20 04	0 6	0 7	7 39	1 33	17 53	-25	0 8
PC-229A	9/15/2010	4546 81	12 81	4534 00	18 56	0 7	0 6 ^a	7 22	1 30	19 03	-273	0 67
PC-230	9/15/2010	4544 35	11 55	4532 80	16 18	0 6	0 6	7 00	1 65	20 28	-136	0 58

Notes

a - well purged dry

ft - feet

amsl - above mean sea level

B T O C below top of casing

mS/cm millisiemens per centimeter

°C degrees Celsius

mV - Millivolts

mg/L Milligrams per liter

Table 2
Groundwater Sample Results Exceeding CALs
Parish Chemical Area Groundwater Monitoring - Fall 2010

Location ID	Field Sample ID	Date	Analyte	Result (mg/L)	MDL (mg/L)	RL (mg/L)	Resident Indoor Air CAL (mg/L)	Commercial/Industrial Indoor Air CAL (mg/L)
GPW-0180	GPW-0180	9/15/2010	bis(2-CHLOROETHYL) ETHER	0 018 J	0 00041	0 01	0 0143	0 177
MW-124S	MW-124S	9/13/2010	bis(2-CHLOROETHYL) ETHER	13 J	0 12	2 8	0 0143	0 177
	MW-9124S	9/13/2010	bis(2-CHLOROETHYL) ETHER	13 J	0 078	1 9	0 0143	0 177
	MW-124S	10/28/2010	bis(2-CHLOROETHYL) ETHER	34	0 078	1 9	0 0143	0 177
PC-205	PC-205	9/15/2010	bis(2-CHLOROETHYL) ETHER	0 016 J	0 0004	0 0099	0 0143	0 177
PC-206	PC-206	9/15/2010	bis(2-CHLOROETHYL) ETHER	0 018 J	0 00041	0 0099	0 0143	0 177
PC-213	PC-9213	9/15/2010	bis(2-CHLOROETHYL) ETHER	0 076 J	0 00042	0 01	0 0143	0 177
	PC-213	9/15/2010	bis(2-CHLOROETHYL) ETHER	0 16 J	0 0004	0 0098	0 0143	0 177
PC-219	PC-219	9/14/2010	bis(2-CHLOROETHYL) ETHER	0 023 J	0 00039	0 0096	0 0143	0 177
PC-223	PC-223	9/14/2010	bis(2-CHLOROETHYL) ETHER	0 04 J	0 00042	0 01	0 0143	0 177
PC-228	PC-228	9/15/2010	bis(2-CHLOROETHYL) ETHER	0 022 J	0 00041	0 0099	0 0143	0 177
PC-229A	PC-229A	9/15/2010	bis(2-CHLOROETHYL) ETHER	0 03 J	0 0004	0 0099	0 0143	0 177

Notes

MW-124S was sampled as part of the Perimeter-In Groundwater Monitoring Program for VOCs, SVOCs and Ammonia as N

However, only VOCs and SVOCs results from MW-124S are discussed in this report

Groundwater sample PC-9213 is a field duplicate sample for PC-213

Groundwater sample MW-9124S is a field duplicate sample for MW-124S

CAL - Corrective Action Level

MDL - method detection limit

mg/L - milligrams per liter

J - estimated concentration

RL - reporting limit

Figures



File: X:\Projects\USS-Geneva\GIS\SWMUG_maps\4.0\GW-4.5 Parish\Fall 2010\Fig2_Parish_AnalyticalResults.mxd

Aerial Photo Flown: September 2008

- Monitoring Well
- Piezometer
- Groundwater Elevation Location
Monitoring Well / Piezometer
- 4542— Potentiometric Surface Contour (ft amsl)
- General Groundwater Flow Direction
- Property Boundary

- Bis(2-chloroethyl)ether Concentrations (mg/L)**
- 0.0143 Residential CAL (4.58 Acres) (dashed where inferred)
 - 0.078 Construction Worker CAL (0.44 Acres)
 - Solid Waste Management Unit (SWMU)
(USS et al., 2009)

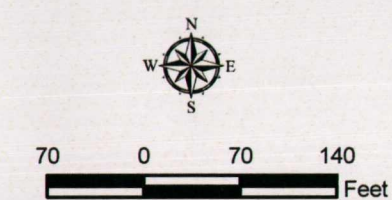
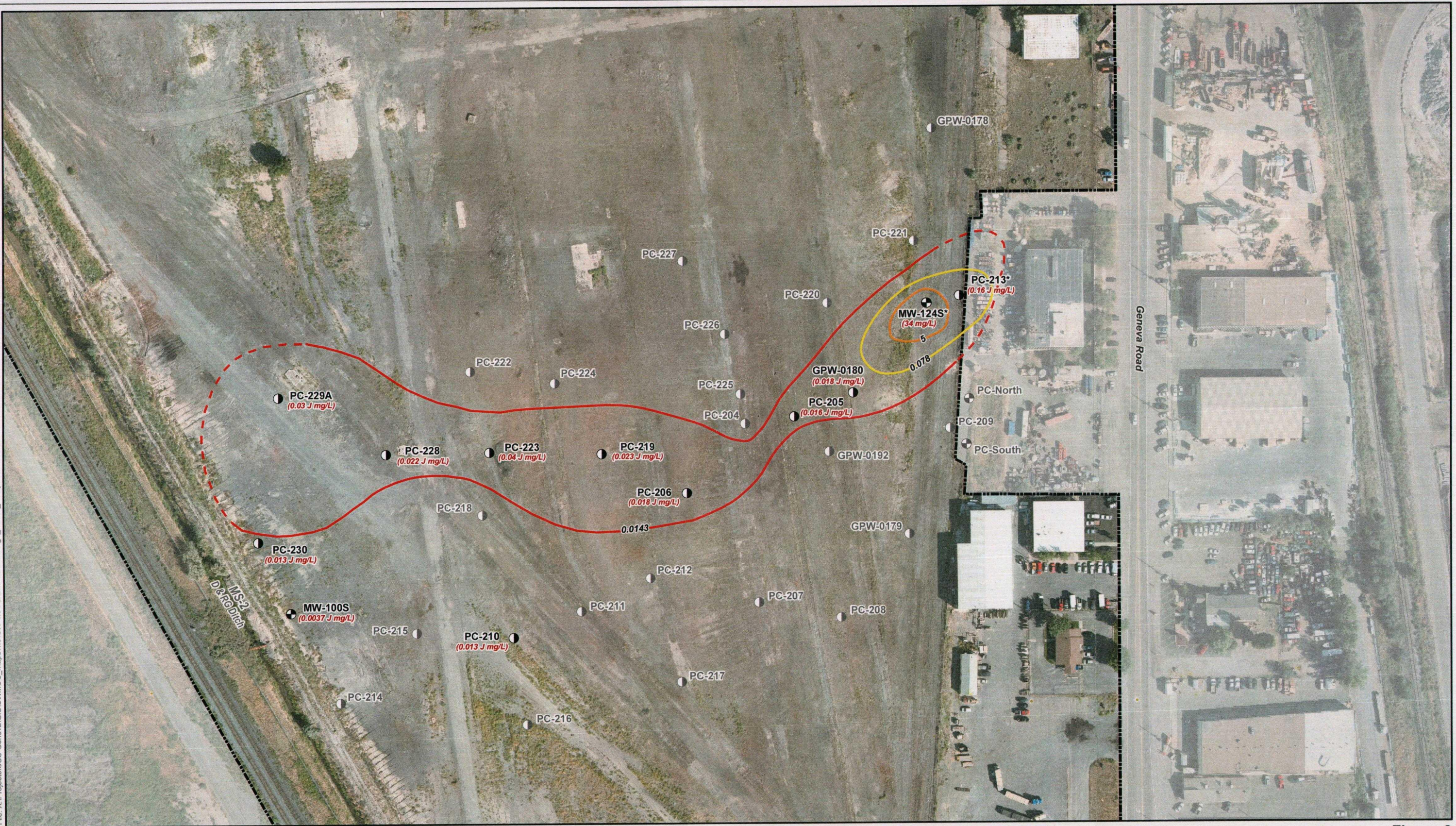


Figure 1
Location / Potentiometric
Surface Contour Map
Parish Chemical Area (SWMU GW-4.5)
Fall 2010
Former Geneva Steel Facility
Vineyard, Utah

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Aerial Photo Flown: September 2008

- PGMP Monitoring Well
- Piezometer
- Monitoring Well Not Sampled
- Piezometer Not Sampled
- Property Boundary
- Solid Waste Management Unit (SWMU)
(Approximate Boundaries)

Bis(2-chloroethyl)ether Concentrations (mg/L)

- 0.0143 Residential CAL (4.58 Acres) (dashed where inferred)
- 0.078 Construction Worker CAL (0.44 Acres)
- 5

Notes:
(0.03 mg/L) - Bis(2-chloroethyl)ether concentration in groundwater
* - Field Duplicate collected at this location. The greater of the two values is displayed.
J - The associated value is an estimated quantity.

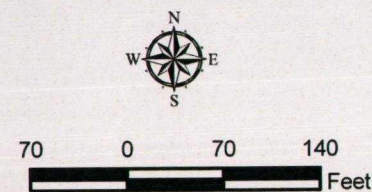


Figure 2
Bis(2-chloroethyl)ether Concentration in Groundwater
Parish Chemical Area (SWMU GW-4.5)
Fall 2010
Former Geneva Steel Facility Vineyard, Utah

Appendix A

Groundwater Sampling Logs

GROUNDWATER SAMPLING FORM

Project Parrish Chem
 Sample Location PC-223
 Sample ID PC-223
 Sample Date 9/14/10
 Sample Time 15:10
 QA/QC Sample (Type and ID) none
 Water Quality Meter Eureka
 Depth of Pump Intake (BTOC) 13.8 ft
 Sample Filtered (Y/N) (Y) Analyte none

PID Screen 0
 Total Depth (BTOC) 13.92 ft
 Depth to Water (BTOC) 12.75
 Depth of Water Column 1.17
 Calculated Purge 0.14 gal
 Actual Purge 0.20 gal
 Sample Method peristaltic pump & disp. tubing
 Depth of Product na
 Filter Manufacture/Size na

Time	Vol (gal)	pH	Cond (µS/cm)	Temp (°C)	ORP (mV)	DO (mg/L)	Turb (NTU)	Notes and Comments
15:06	initial	7.96	1.764	22.96	27	6.93	2920	muddy purge water
15:06	0.15	7.42	1.590	22.51	38	2.73	998	

Sampling Personnel EH & CH

Page 1 of 1

URS

GROUNDWATER SAMPLING FORM

Project Parvish Chemical
 Sample Location PC-219
 Sample ID PC-219
 Sample Date 7/14/10
 Sample Time 15:35
 QA/QC Sample (Type and ID) none
 Water Quality Meter Enviroka
 Depth of Pump Intake (BTOC) _____
 Sample Filtered (Y/N) Y Analyte none

PID Screen 0

Total Depth (BTOC) 19 10

Depth to Water (BTOC) 12 74 ft

Depth of Water Column 6.36 ft

Calculated Purge 0.78 gal

Actual Purge _____

Sample Method pump & disposable tubing

Depth of Product na

Filter Manufacture/Size na

[illegible]

Sampling Personnel EN & CN

Page 1 of 1

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GROUNDWATER SAMPLING FORM

Project Parrish Chemical
 Sample Location PC-213
 Sample ID PC-213
 Sample Date 9/15/10
 Sample Time 10 20 10 05
 QA/QC Sample (Type and ID) FB, FD (PC-9213), MS/MSD
 Water Quality Meter Eureka
 Depth of Pump Intake (BTOC) 12 ft
 Sample Filtered (Y/N) Analyte none

PID Screen 0
 Total Depth (BTOC) 16.65 ft
 Depth to Water (BTOC) 4.08 ft
 Depth of Water Column 8.57 ft
 Calculated Purge 1.05 gal
 Actual Purge 1.1 gal
 Sample Method p-pump & disasable tubing
 Depth of Product na
 Filter Manufacture/Size na

Time	Vol (gal)	pH	Cond (µS/cm)	Temp (°C)	ORP (mV)	DO (mg/L)	Turb (NTU)	Notes and Comments
10 05	0.15	6.92	1.312	18.77	-122	2.38	278	
10 06	0.5	7.19	1.293	18.41	-155	0.86	497	
10 08	0.75	7.19	1.316	18.34	-160	0.69	729	
10 10	1	7.20	1.326	18.30	-162	0.69	1039	

Sampling Personnel CH & EM

Page 1 of 1

URS

GROUNDWATER SAMPLING FORM

Project Parrish Chemical
 Sample Location GPW-0180
 Sample ID GPW-0180
 Sample Date 9/5/10
 Sample Time 11:05
 QA/QC Sample (Type and ID) none
 Water Quality Meter Eureka
 Depth of Pump Intake (BTOC) 15 ft
 Sample Filtered (Y/N) Analyte no

PID Screen 0

Total Depth (BTOC) 17 68

Depth to Water (BTOC) 10.65 ft

Depth of Water Column 7 03

Calculated Purge 0 86 gal

Actual Purge 1 gal

Sample Method pump & disposable tubing

Depth of Product na

Filter Manufacture/Size na

[illegible]

Sampling Personnel CH JEH

Page - 1 of 1

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GROUNDWATER SAMPLING FORM

Project Parrish Chemical
 Sample Location PC-205
 Sample ID PC-205
 Sample Date 9/15/10
 Sample Time _____
 QA/QC Sample (Type and ID) none
 Water Quality Meter Eureka
 Depth of Pump Intake (BTOC) 14 ft
 Sample Filtered (Y/N) (Y) Analyte none

PID Screen 3
 Total Depth (BTOC) 1752 ft
 Depth to Water (BTOC) 985 ft
 Depth of Water Column 767
 Calculated Purge 0.94 gal
 Actual Purge _____
 Sample Method. peristaltic pump & disposable tubing
 Depth of Product na
 Filter Manufacture/Size na

Time	Vol (gal)	pH	Cond (µS/cm)	Temp (°C)	ORP (mV)	DO (mg/L)	Turb (NTU)	Notes and Comments
11:19	initial	7.62	1.091	20.60	-17	4.44	964	cloudy (sediment) purge water
11:20	0.3	7.47	1.069	19.98	-23	1.52	582	
11:22	0.6	7.37	1.037	19.82	-26	0.84	1240	
11:23	0.8	7.36	1.022	19.73	-30	0.61	64	

Sampling Personnel EM & CP

Page 1 of 1

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GROUNDWATER SAMPLING FORM

Project Parrish Chemical
 Sample Location PC-206
 Sample ID PC-206
 Sample Date 9/15/10
 Sample Time _____
 QA/QC Sample (Type and ID) none
 Water Quality Meter Eureka
 Depth of Pump intake (BTOC) 15 ft
 Sample Filtered (Y/N) Y Analyte: none

PID Screen. 0
 Total Depth (BTOC) 18.30 ft
 Depth to Water (BTOC) 12.58
 Depth of Water Column 5.72 ft
 Calculated Purge 0.7 gal
 Actual Purge. _____
 Sample Method pump & disp. tubing
 Depth of Product: na
 Filter Manufacture/Size: na

Time	Vol (gal)	pH	Cond (µS/cm)	Temp (°C)	ORP (mV)	DO (mg/L)	Turb (NTU)	Notes and Comments
11:40	0.5	7.61	1.077	20.35	-6	4.96	15.73	
11:42	0.25	7.54	1.070	19.33	-10	3.08	1.5	
11:44	0.5	7.41	1.048	19.08	-7	2.01	0.4	
11:46	0.75	7.42	1.040	18.99	-10	1.37	0.5	

Sampling Personnel CM & EM

Page 1 of

URS

GROUNDWATER SAMPLING FORM

Project Parrish Chemical
Sample Location: PC-228
Sample ID: PC-228
Sample Date 9/15/10
Sample Time 12:30
QA/QC Sample (Type and ID): none
Water Quality Meter: Euteka
Depth of Pump Intake (BTOC) 18 ft
Sample Filtered. (Y/N) Analyte none

PID Screen	0
Total Depth (BTOC):	20.04
Depth to Water (BTOC):	15.3
Depth of Water Column	4.73 ft
Calculated Purge.	0.58 gal
Actual Purge	0.7
Sample Method	pump & dis
Depth of Product	na
Filter Manufacture/Size	na

[illegible]

Sampling Personnel EM & CH

Page 1 of 1

URS

GROUNDWATER SAMPLING FORM

Project Parrish Chemical
 Sample Location. PC-229A
 Sample ID PC-229A
 Sample Date 9/5/10
 Sample Time 1255
 QA/QC Sample (Type and ID) none
 Water Quality Meter Eureka
 Depth of Pump Intake (BTOC) 15 ft
 Sample Filtered (Y/N) Analyte: none

PID Screen 0

Total Depth (BTOC) 18 56

Depth to Water (BTOC). 12 81

Depth of Water Column 5 75

Calculated Purge. 0 71 gal

Actual Purge: 0.6 ~~0.6~~ gal

Sample Method pump & disposable tubing

Depth of Product: 1m

Filter Manufacture/Size: N9

[illegible]

Sampling Personnel CH JEH

Page 1 of 1

URS

GROUNDWATER SAMPLING FORM

Project Parrish Chemical
 Sample Location PC-230
 Sample ID PC-230
 Sample Date 9/15/10
 Sample Time 13:20
 QA/QC Sample (Type and ID) none
 Water Quality Meter Eutech
 Depth of Pump Intake (BTOC) 14 ft
 Sample Filtered (Y/N) (N) Analyte none

PID Screen 0
 Total Depth (BTOC): 16.18
 Depth to Water (BTOC) 11.55
 Depth of Water Column 4.63
 Calculated Purge ~~0.22~~ gal 0.57
 Actual Purge 0.6 gal
 Sample Method 1-pump & disp. tubing
 Depth of Product na
 Filter Manufacture/Size na

Time	Vol (gal)	pH	Cond (µS/cm)	Temp (oC)	ORP (mV)	DO (mg/L)	Turb (NTU)	Notes and Comments
13:15	initial	7.25	1.746	21.37	141 233	2.33	4600	dark, cloudy purge water (w/ sediment)
13:17	0.25	7.11	1.720	21.20	-141	0.91	1233	water clearing up
13:18	0.4	6.96	1.686	20.68	-136	0.71	497	
13:19	0.55	7.00	1.652	20.28	-136	0.58	650	

Sampling Personnel EM & CM

Page 1 of 1

URS

GROUNDWATER SAMPLING FORM

Project: Parrish Chemical
 Sample Location: PC-210
 Sample ID: PC-210
 Sample Date: 9/15/10
 Sample Time: 12:10
 QA/QC Sample (Type and ID): _____
 Water Quality Meter: Eureka
 Depth of Pump Intake (BTOC): 15 ft
 Sample Filtered: (Y/N) Analyte: none

PID Screen: 0
 Total Depth (BTOC): 17.85 ft
 Depth to Water (BTOC): 10.60 ft
 Depth of Water Column: 7.25 ft
 Calculated Purge: 0.89 gal
 Actual Purge: 1 gal
 Sample Method: pump & disposable tubing
 Depth of Product: nk
 Filter Manufacture/Size: na

Time	Vol (gal)	pH	Cond (uS/cm)	Temp (oC)	ORP (mV)	DO (mg/L)	Turb (NTU)	Notes and Comments
12:01	~ 4.1	7.57	1.449	19.74	6	1.02	811	
12:02	0.25	7.52	1.438	20.36	4	1.86	755	
12:03	0.5	7.55	1.444	19.82	-2	1.03	1208	
12:05	0.76	7.47	1.436	19.21	-3	0.95	2951	
12:06	0.9	7.44	1.434	18.69	-4	0.95	2283	

Sampling Personnel: CU & E/H

Page: 1 of 1

URS

GROUNDWATER SAMPLING FORM

Project Perimeter - ILL
 Sample Location MW-1005
 Sample ID MW-1005
 Sample Date 8/13/10
 Sample Time 15:05
 QA/QC Sample (Type and ID) none
 Water Quality Meter Eureka
 Depth of Pump Intake (BTOC) 16 ft
 Sample Filtered (Y/N) (Y) Analyte ndry

PID Screen 0
 Total Depth (BTOC) 17.18 ft
 Depth to Water (BTOC) 10.20
 Depth of Water Column 6.98
 Calculated Purge 3.4 gal
 Actual Purge. _____
 Sample Method submersible pump
 Depth of Product na
 Filter Manufacture/Size na

Time	Vol (gal)	pH	Cond (µS/cm)	Temp (°C)	ORP (mV)	DO (mg/L)	Turb (NTU)	Notes and Comments
14:47	12.5	7.77	1.330	20.40	68	4.62	7	
14:50	0.4	7.50	1.305	20.35	74	3.13	4.0	
14:52	0.9	7.49	1.327	21.20	79	2.66	0.4	
14:54	1.5	7.56	1.343	21.65	77	2.79	4.7	
14:58	2.5	7.68	1.352	21.18	70	2.49	3.6	
15:01	3.3	7.63	1.329	20.67	70	2.00	4.2	

Sampling Personnel CU + EM

Page 1 of 1

URS

GROUNDWATER SAMPLING FORM

Project Perimeter - In
 Sample Location MW-1245
 Sample ID MW-1245
 Sample Date 9/13/10
 Sample Time ~~14:02~~ 14:15
 QA/QC Sample (Type and ID) FB FD (MW-91245), MS/MSD/
 Water Quality Meter Eureka Equip
 Depth of Pump Intake (BTOC) 16 ft
 Sample Filtered (Y/N) (Y/N) Analyte none

PID Screen 0
 Total Depth (BTOC) 16 99 ft
 Depth to Water (BTOC) 7.83
 Depth of Water Column 9.16
 Calculated Purge 4.5 gal
 Actual Purge _____
 Sample Method submersible pump
 Depth of Product na
 Filter Manufacture/Size na

Time	Vol (gal)	pH	Cond (µS/cm)	Temp (°C)	ORP (mV)	DO (mg/L)	Turb (NTU)	Notes and Comments
13:50	1.5	7.49	1.207	18.03	71	5.17	6.1	reddish brown (muddy) water
13:52	0.5	7.43	1.196	18.29	77	4.67	5.0	
13:54	1.0	7.51	1.242	18.93	73	4.08	6.1	
13:58	1.7	7.55	1.274	20.20	56	3.42	6.0	
14:02	2.5	7.61	1.296	20.28	50	2.90	5.4	
14:05	3.1	7.62	1.312	20.32	48	2.63	6.0	
14:08	3.8	7.60	1.319	20.24	43	2.35	6.2	
14:13	4.5	7.61	1.329	20.20	30	2.10	5.6	

Sampling Personnel EH & CH

Page 1 of 1

URS

GROUNDWATER SAMPLING FORM

Project PGMP
 Sample Location MW-124S
 Sample ID MW-124S
 Sample Date 10-28-10
 Sample Time 16:52
 QA/QC Sample (Type and ID) NONE
 Water Quality Meter Potentiometer
 Depth of Pump Intake (BTOC) Bottom of well
 Sample Filtered (Y/N) (N) Analyte

PID Screen NA
 Total Depth (BTOC) 15.99
 Depth to Water (BTOC) 7.73
 Depth of Water Column 8.26
 Calculated Purge 4.04
 Actual Purge 4.5
 Sample Method submersible pump 2"
 Depth of Product NONE
 Filter Manufacture/Size NA

Time	Vol (gal)	pH	Cond (µS/cm)	Temp (°C)	ORP (mV)	DO (mg/L)	Turb (NTU)	Notes and Comments
11:25	0.5	7.40	1197	16.77	101	1.13	149	odor
11:30	1.0	7.41	1214	16.79	99	1.08	142	"
11:40	2.0	7.45	1298	17.64	39	0.83	29	"
11:42	2.5	7.47	1311	17.07	30	0.79	23	"
11:45	3.0	7.48	1317	17.21	4	0.65	12	"
11:47	3.5	7.50	1317	17.19	-1	0.60	15	"
11:50	4.0	7.49	1318	17.20	-12	0.50	13	"
11:52	4.5	7.49	1317	17.18	-30	0.46	14	"

Sampling Personnel Helen Marie Cannon

Page 1 of 1

URS

Appendix B

Data Validation Report

TABLE OF CONTENTS

Section 1	Introduction	1 1
Section 2	Data Validation Process	2 1
2 1	Laboratory Performance Data Evaluation Criteria	2-1
2 1 1	Initial Calibration	2-1
2 1 2	Initial and/or Continuing Calibration	2-1
2 1 3	Internal Standard Data	2-1
2 1 4	Laboratory Control Sample (LCS) Analysis	2-2
2 1 5	Dual Column Confirmation Results	2-3
2 1 6	ICP Interference Check Sample (ICS) for Metals	2-3
2 2	Sample-Specific Data Evaluation Criteria	2-4
2 2 1	Case Narrative Comments Chain of Custody (COC) and Sample Receipt	2-4
2 2 2	Holding Times	2-4
2 2 3	Blanks	2-5
2 2 4	Matrix Spike Analysis	2-5
2 2 5	Duplicate Sample Analysis	2-6
2 2 6	Internal Standard Data (Metals only)	2-6
2 2 7	Post-Digestion Spike Recovery (Metals only)	2-6
2 2 8	Serial Dilution (Metals only)	2-7
2 2 9	Surrogate Recoveries	2-7
2 2 10	Field Duplicate Results	2-8
2 2 11	Anion/Cation Balance	2-8
2 2 12	Balance of Total to Partial Analyses	2-8
2 2 13	Reporting of Isomer Totals (VOCs only)	2-9
Section 3	Data Validation Narrative TESTAMERICA Denver Data Package 280 7468	3 1
3 1	Overall Assessment	3-1
3 2	Notes from Case Narrative	3-1
3 3	COC and Sample Receipt	3-2
3 4	Holding Times	3-2
3 5	Blanks	3-2
3 6	Laboratory Control Sample	3-2
3 7	Surrogate Recoveries	3-3
Section 4	Site Specific Quality Control Assessment	4 1
4 1	Matrix Spike Analyses	4-1
4 2	Field Duplicate Analyses	4-2
4 3	Field Blank Analyses	4-3
4 4	Equipment Blank Analyses	4-3

TABLE OF CONTENTS

Section 5	Overall Assessment of Analytical Data	5 1
5 1	Precision	5-1
5 2	Accuracy	5-1
5 3	Representativeness	5-1
5 4	Completeness	5-2
5 5	Comparability	5-2
5 6	Sensitivity	5-2

List of Tables

Table 1-1	Parameters Analyzed and Analytical Methods Used for Geneva Steel Samples
Table 1-2	Data Validation Qualifier Definitions
Table 1-3	Data Validation Qualifier Codes and Bias Direction Codes

Attachments

Attachment 1 – MS and MSB Results

The following sections describe the data review process and the results of the data review conducted by URS Corporation (URS) on the laboratory analytical data package received for groundwater samples collected in September 2010 for the Parish Chemical 2010 Groundwater Sampling Event at the Geneva Steel facility (on behalf of United States Steel Corporation and Anderson Geneva Development, LLC/Ice Castle Retirement Fund LLC). TestAmerica Laboratories Inc. of Denver, Colorado (TestAmerica-Denver) conducted the chemical analyses. Results were reported in one analytical data package. The samples were analyzed for the analyses listed in Table 1-1 below as requested on the chain-of-custody forms (COCs), and in accordance with the sampling program requirements. This data validation report presents the results of the data validation conducted on the laboratory analytical data package received.

**Table 1-1
PARAMETERS ANALYZED AND ANALYTICAL METHODS
USED FOR GENEVA STEEL SAMPLES**

Parameter	Analytical Method
Volatile Organic Compounds (VOCs)	SW-846 8260B
Semivolatile Organic Compounds (SVOCs)	SW-846 8270C

SW846 = USEPA Office of Solid Waste Test Methods for Evaluating Solid Wastes Physical/Chemical Methods

The review consisted of evaluation of laboratory performance criteria and sample-specific criteria as described in the Resource Conservation and Recovery Act (RCRA) Facility Investigation, Remedial Facility Investigation (RFI) Work Plan Data Collection Quality Assurance Plan (DCQAP) (August 2004), Functional Guidelines for Organic Data Review (June 2008) and Functional Guidelines for Inorganic Data Review (October 2004) as appropriate to the analytical method, and Quality Control (QC) limits specified in the DCQAP were utilized as guidance during data validation. Section 8.0 of the DCQAP provides details as to how Functional Guidelines guidance was implemented.

The laboratory performance parameters included initial calibration procedures and results, continuing calibration procedures and results, laboratory control sample (LCS) results, Inductively Coupled Plasma (ICP) interference check samples (ICSS), compound identification and internal standard recovery. In accordance with the DCQAP, the laboratory is required to identify any quality assurance/quality control (QA/QC) issues relative to the laboratory performance criteria in the case narrative. These QA/QC issues identified in the case narrative were evaluated to verify that the laboratory analyses are in compliance with the method. Section 2.1 summarizes the QC requirements for the laboratory performance criteria that were used in the data validation process and how data were qualified.

The sample-specific criteria evaluated included chain-of-custody (COC) and sample receipt documentation, holding times, blank results, matrix spike/matrix spike duplicate (MS/MSD), sample analysis, surrogate spike compound recovery, field duplicate results agreement, Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) internal standard recovery, post-digestion spike recoveries (PDS), and serial dilution results. The sample-specific criteria were evaluated for all of the data received. Section 2.2 summarizes the sample-specific criteria that were used in the data validation process and how data were qualified.

Section 3 presents the data validation narrative for the QA/QC issues relative to the laboratory performance criteria identified in the laboratory case narrative and the sample-specific criteria. Data validation narrative results are presented in Section 3 for each data package. Section 4 provides a discussion of the matrix spike/matrix spike duplicate results, field duplicate results, and the field blank results. This report is concluded with an overall assessment of the complete data set presented in Section 5.

During the data validation process, the data reviewer annotated on a copy of the analytical data sheets any data validation qualifiers assigned ("U," "J," "UJ," "N," "NJ" and "R") and associated qualifier and bias codes as listed in Tables 1-2 and 1-3. The qualified sheets were used to generate tables with qualifiers. The purpose of the qualifier codes is to provide information with regard to the data quality condition(s) that resulted in the assigned qualifiers. The bias code provides an indication of the bias direction of the results qualified as estimated based on data quality condition(s) that resulted in the data qualification and the results of the other associated quality control analyses. The data qualifier codes are followed by a hyphen and the applicable bias code. For example, a result qualified as estimated due to a holding time exceedance, which resulted in a potential low bias in the result, has the following code annotated on the data sheet, "HT-L." In the case of multiple data quality conditions resulting in qualification, each qualifier code is listed and separated by a comma. For example, a result qualified as estimated due to low matrix spike recovery and poor method duplicate precision would have the following codes annotated on the data sheet: MS, SD - 1, with the I indicating that the direction of bias is indeterminate.

Table 1-2
DATA VALIDATION QUALIFIER DEFINITIONS

Qualifier	Definitions ¹
U	The analyte was analyzed for, but was not detected above the level of the associated value. The associated value is the sample quantitation limit.
J	The associated value is an estimated quantity.
UJ	The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The data are unusable. (Note: Analyte may or may not be present.)
NJ	The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

¹Definitions cited from the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, 1999.

Table 1-3
DATA VALIDATION QUALIFIER CODES AND BIAS DIRECTION CODES

Qualifier Code	Data Quality Conditions Resulting in Assigned Qualification
General Use	
P	Preservation requirement (e.g., temperature or pH) was not met.
HT	Holding time requirement was not met.
MB	Method blank or preparation blank contamination.
LCS	Laboratory control sample evaluation criteria not met.
FB	Field blank contamination.
SQL	The analysis meets all qualitative identification criteria but the measured concentration is less than

Qualifier Code*	Data Quality Conditions Resulting in Assigned Qualification
	the reporting limit
RB	Rinsate blank contamination
FD	Field duplicate evaluation criteria not met
TB	Trip Blank Contamination
RL	Reporting limit exceeds decision criteria (for nondetects)
Inorganic Methods	
ICV	Initial calibration verification evaluation criteria not met
CCV	Continuing calibration verification evaluation criteria not met
CCB	Continuing calibration blank contamination
PB	Preparation blank contamination
ICS	Interference check sample evaluation criteria not met
D	Laboratory duplicate precision or MS/MSD precision evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post digestion spike recovery outside acceptance range
MSA	Method of standard additions correction coefficient ≤ 0.995
DL	Serial dilution results did not meet evaluation criteria
Organic Methods	
TUNE	Instrument performance (tuning) criteria not met
ICAL	Initial calibration evaluation criteria not met
CCAL	Continuing calibration evaluation criteria not met
SUR	Surrogate recovery outside acceptance range
MS/SD	Matrix spike/matrix spike duplicate precision criteria not met
IS	Internal standard evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
ID	Target compound identification criteria not met
Bias Codes	
H	Bias in sample result likely to be high
L	Bias in sample result likely to be low
I	Bias in sample result is indeterminate

*In the case of multiple qualifier codes all codes would be listed and separated by a comma

The analytical data were generated and reviewed in accordance with the protocols summarized in the following subsections, as applicable to the reported methods. The data validation effort was performed to evaluate the usability of the sample data for meeting the project objectives.

2.1 LABORATORY PERFORMANCE DATA EVALUATION CRITERIA

The laboratory performance evaluation was limited to the parameters identified by the laboratory in the case narrative not meeting method acceptance criteria. The subsections below discuss how laboratory performance parameters were to be evaluated. If the case narrative describes a laboratory performance criterion not covered by the subsections below, the data review person evaluated the associated data against method requirements to determine the need for data qualification. The laboratory performance criteria includes initial and continuing calibration, laboratory control sample results, and other checks as pertinent to the analytical technique (i.e., GC-MS instrument check (tuning) and GC-MS internal standard performance). Section 2.1 summarizes the review of laboratory performance criteria. The results of any QA/QC issues identified in the case narrative are presented in Section 3.

2.1.1 Initial Calibration

The analytical method was used to determine the QC acceptance criteria for initial calibration. If the case narrative or data validation process indicated that the initial calibration for any analyte did not meet the acceptance criteria, then all results for that given analyte associated with the initial calibration were qualified as estimated (J/UJ) with a qualifier code of "ICAL" and a bias code of "I" for indeterminate direction of bias.

2.1.2 Initial and/or Continuing Calibration

The analytical method was used to determine the QC acceptance criteria for initial and continuing calibration verification. If the case narrative or data validation process indicated that the initial or continuing calibration verification for any analyte did not meet the acceptance criteria, then all results for that given analyte associated with the initial or continuing calibration verification were qualified as estimated (J/UJ) with a qualifier code of "ICV" or "CCV" for inorganics and "CCAL" for organics. If the data reviewer could discern a probable magnitude and/or direction of bias to the associated sample results based on the information provided, then appropriate qualifier bias codes were assigned.

Because the Methods 8260B and 8270C do not provide the criterion for the percent drift (%D) for non calibration check compounds (CCCs), the reviewer used guidance from Functional Guidelines and used 25% for the criterion for the %D for all other target compounds.

2.1.3 Internal Standard Data

The analytical method was used to determine the QC acceptance criteria for internal standard area counts for GC/MS organic analysis and for internal standard quantitation. Internal standard area counts are not a direct measure of the accuracy of the analysis. Low internal standard area counts for sample analysis relative to those observed in the associated continuing calibration analysis may be indicative of low extraction or purging efficiency which decreases the analysis sensitivity (raises the detection limit). High internal standard area counts may be indicative of

coeluting interferences at the retention time of the internal standard in the sample, may be caused by a drift in detector sensitivity, or may be caused by injection of a different amount of sample extract. Coeluting interferences to the internal standard may result in a low bias in reported results quantified by the given internal standard. Injection of a larger volume of extract would result in increased sensitivity of the analysis (lowered detection limit).

- If data validation indicated that internal standard area counts were below the lower acceptance limit, then results reported as not-detected were qualified as estimated (“UJ”) and results reported as detected did not require qualification since the calculation corrects for reduced extraction efficiency.
- If data validation indicated that internal standard area counts were above the upper acceptance limit, then results reported as detected or as not-detected were qualified as estimated (‘J/UJ’).

A qualifier code of IS was assigned to all results qualified on the basis of internal standard area counts.

2.1.4 Laboratory Control Sample (LCS) Analysis

The analyte recoveries obtained for LCS analyses were compared to analytical method requirements and to the acceptance range contained in Table 3-1 of the DCQAP. With the exception of 13 target analytes for SVOCs, all analytes specified in the analytical method were spiked into the LCS (see Section 5.2 for effect on data usability). Data associated with LCS recoveries outside the acceptance range were qualified as follows:

- If the LCS recovery for an analyte was greater than the upper acceptance limit, suggesting a potential high bias in reported results, all positive results for that analyte in all associated samples were qualified as estimated (‘J’) whereas nondetect results were considered to be acceptable for use without qualification because the high bias did not affect nondetect results.
- If the LCS recovery for an analyte was less than the lower acceptance limit but >30% suggesting a potential low bias in reported results, positive and nondetect results for that analyte in all associated samples were qualified as estimated (‘J’ or ‘UJ’).
- If the LCS recovery for an analyte was less than the lower acceptance limit and <30% positive sample results were qualified as estimated (“J”) whereas nondetect results were qualified as unusable (‘R’) for all associated sample results.
- If the LCS recovery for an analyte was greater than the lower acceptance limit but <30% and >10%, positive and nondetect results for that analyte in all associated samples were qualified as estimated (‘J’ or ‘UJ’).
- If the LCS recovery for an analyte was less than 10%, positive sample results were qualified as estimated (‘J’) whereas nondetect results were qualified as unusable (‘R’) for all associated sample results.

A qualifier code of LCS was assigned to all results qualified or rejected on the basis of LCS recoveries.

Because a summary form was provided for this laboratory performance parameter in the data packages for each of the requested methods this parameter was evaluated and discussed in each of the review narrative sections presented in Section 3

2.1.5 Dual Column Confirmation Results

A second, dissimilar column confirmation was required by some of the GC analysis methods. If the analytical method or laboratory contract specifies quantitative evaluation of second column result agreement, the following qualifications were considered:

- If the RPD between primary and secondary column positive detect results was greater than 40%, and the difference between the values reported for the two columns was likely due to co-eluting interference, the data reviewer qualified the reported sample results as presumptive evidence of compound presence, but at an estimated quantity ("NJ"). If the result reported by the laboratory was the higher of the two results, and if there was evidence that the higher value was caused by co-eluting interference, then the data reviewer may cross out the reported result and replace it with the lower of the two results, and
- If the samples analyzed were not considered as previously well-characterized for the constituents present and second column confirmation was not performed for a GC analysis, the reported sample results were qualified as presumptive evidence of presence at an estimated quantity ("NJ")
- If the RPD between primary and secondary column positive detect results was greater than 40% and there was no evidence of co-eluting interferences, the data reviewer qualified the sample result as estimated ("J")

2.1.6 ICP Interference Check Sample (ICS) for Metals

The analytical method specifies the QC acceptance criteria for ICS analysis for metals analysis methods covered under the DCQAP:

- If the percent recovery (%R) for analytes present in the ICS sample was above the upper acceptance criterion, then results reported as detected for that analyte in associated samples for which the potentially interfering elements were present at concentrations equivalent to or greater than those present in the ICS sample were qualified as estimated ("J") with a potential high bias. Nondetectable results did not require qualification.
- If the %R for analytes present in the ICS sample was less than the lower acceptance criterion, then both detected and nondetected results for that analyte in associated samples for which the potentially interfering elements were present at concentrations equivalent to or greater than those present in the ICS sample were qualified as estimated ("J/UJ") with a potential low bias.
- If the analytes not actually present in the ICS sample were reported at concentrations for which the absolute value of the concentration was greater than the sample quantitation limit for the analyte, then the potential effect and magnitude of the bias was evaluated for all associated samples for which the potentially interfering elements were present at concentrations equivalent to or greater than those present in the ICS sample. If the

concentration was reported as a positive value and the magnitude of the ICS sample result represents more than 25% of an associated sample result reported as detected, then the associated sample result was qualified as estimated (“J”) with a potential high bias. In this case, nondetectable results did not require qualification. If the concentration was reported as a negative value and the absolute value of the magnitude of the ICS sample result represents more than 25% of an associated sample result (or sample quantitation limit for nondetects), then the associated sample result was qualified as estimated (“J/UJ”) with a potential low bias.

A qualifier code of “ICS” was assigned to all results qualified on the basis of ICS results.

Because a summary form was provided for this laboratory performance parameter in the data packages for each of the metals, this parameter was evaluated and discussed in each of the review narrative sections presented in Section 3.

2.2 SAMPLE-SPECIFIC DATA EVALUATION CRITERIA

The data validation process also included a review of sample-specific criteria for all of the data packages for those parameters that are sample-related. All of the data were reviewed for the sample-specific criteria described in this section. No recalculation of results from the raw data or transcription error checking was performed during the review of the sample-specific criteria.

In addition to the review criteria summarized in this section, the validator reviewed the laboratory case narrative to determine if the information provided by the laboratory accurately reflects all issues and noteworthy items encountered during the sample analysis. If notations identified in the case narrative were not covered by this section and were found to indicate a potential effect on data quality, the data reviewer evaluated the issue. If the DCQAP, analytical method, or Functional Guidelines did not specify requirements related to the criterion under evaluation, the data reviewer utilized professional judgment to evaluate the effect of the reported item or condition on the associated analytical data. All uses of professional judgment were described in the data validation review narrative. The results of the sample-specific criteria evaluation are presented in Section 3.

2.2.1 Case Narrative Comments, Chain of Custody (COC) and Sample Receipt

The data validation process began with an examination of the laboratory case narrative, COC documentation, and sample receipt and log-in information. Any analytical issues noted in the laboratory case narrative were noted in the data validation narrative along with a summary of the effect on the data and its usability. The analytical results received were compared against those requested on the COC form. Any COC issues or discrepancies were noted in the data validation report. Any issues noted by the laboratory with regard to sample condition upon receipt were also noted.

2.2.2 Holding Times

The holding times were compared to the holding time requirements contained in Tables 4-1 and 4-2 of the DCQAP. Results for analyses not performed within holding time limits were qualified as estimated (“J/UJ”). If the holding time was grossly exceeded (more than two times the holding time limit), the data reviewer utilized professional judgment to evaluate the need to

reject nondetectable results. A qualifier code of "HT" was assigned to all results qualified or rejected on the basis of holding times.

2.2.3 Blanks

The results for rinsate blanks, preparation blanks, calibration blanks, and other blanks reported in the data package were reviewed. If the associated sample matrix was a solid, positive rinsate, calibration, and other associated aqueous blank results were converted to equivalent concentrations in the solid samples by assuming that all contamination found in the aqueous blank aliquot analyzed was potentially present at up to five times that amount in the solid sample aliquot analyzed. Sample results for analytes detected in an associated blank at concentrations less than five times the equivalent blank concentration were qualified as nondetect ("U") at the reported concentration. Negative blank concentrations were evaluated for potential effects (low bias) on sample data when the absolute value of the negative concentration was greater than the MDL. If the negative concentration in a blank may potentially have produced more than a 25% effect on a reported sample result or sample quantitation limit, the associated sample result was qualified as estimated ("J/UJ"). For example, if the blank result was 2 milligrams per liter (mg/l), the MDL was 1 mg/l, and the associated sample result was 5 mg/l, the sample result was qualified since a potential low bias of 2 mg/l represents 40% of the reported concentration and the absolute value of the blank concentration was greater than the MDL.

Preparation blanks are associated with all samples prepared with that sample (preparation batch). Continuing calibration blank samples are considered to be associated with all samples in a given analytical run. The highest continuing calibration blank samples concentration was used for data qualification.

A qualifier code of "MB", "CCB", "FB" or "RB" was assigned to all results qualified on the basis of method blank, continuing calibration blank, field blank, or rinsate blank results, respectively.

2.2.4 Matrix Spike Analysis

The MS recoveries were compared to the criteria contained in Table 3-1 of the DCQAP. For organic and inorganic analyses, data associated with MS or MSD recoveries outside the acceptance range were qualified as follows, using guidance from Functional Guidelines:

- If the recovery of a MS analyte exceeded the upper limit of the acceptance range, suggesting a potential high bias in sample results, positive results for that target analyte in the sample used for the MS were qualified as estimated ("J") whereas, nondetect results for that analyte in the sample were considered acceptable for use without qualification.
- If the recovery of a MS analyte was less than the lower limit of the acceptance range but $\geq 10\%$ for organic analyses and $\geq 30\%$ for inorganic analyses, suggesting a potential low bias in sample results, positive and nondetect results for that analyte in the sample used for the MS were qualified as estimated ("J/UJ").
- If the recovery of a MS analyte was less than the lower limit of the acceptance range and $< 10\%$ for organic analyses and $< 30\%$ for inorganic analyses, positive results were

qualified as estimated (“J”) and nondetect results were qualified as unusable (“R”) for that analyte in the sample used for the MS

- The MS amount for each target analyte was compared to concentrations found for that analyte in the native (unspiked) sample to ensure the appropriate spike level was used, per Functional Guidelines guidance. If the spike level for an analyte was <25% of the concentration for that analyte found in the native sample, the MS percent recovery was considered not to be an appropriate measure of accuracy and therefore, sample results were not qualified based on those MS results

Qualification of results for associated samples in the batch or data package was not performed based on MS recoveries alone. The data reviewer used professional judgment and considered the results of other QC measures such as surrogate recoveries and LCS recoveries in conjunction with MS/MSD results to determine the need for qualification of associated sample results

2.2.5 Duplicate Sample Analysis

Results for the duplicate sample (laboratory duplicate or MSD) were compared to the criteria in Table 3-1 of the DCQAP. If the duplicate results for an analyte did not satisfy the applicable evaluation criterion, results for that analyte in the sample that the duplicate was performed on were qualified as estimated (“J/UJ”). Professional judgment was used to determine if all results for that analyte in all associated samples would need to be qualified. A qualifier code of “D” was assigned to all results qualified on the basis of laboratory duplicate results. A qualifier code of “MS/SD” was assigned to all results qualified on the basis of MS/MSD precision.

2.2.6 Internal Standard Data (Metals only)

Internal standards are used routinely in the analysis for metals by ICP-MS, however, internal standards may be used in the analysis of metals by ICP-AES. Internal standard recoveries for every sample and standard (as the requested level of reporting permits evaluation) will be compared to an acceptance range of 30-120%. Results associated with internal standard recoveries outside the acceptance range where the sample was not diluted and reanalyzed will be qualified as estimated (J/UJ). If upon reanalysis the internal standard recoveries are still outside the acceptance range, the results will be qualified as estimated (J/UJ).

A qualifier code of “IS” was assigned to all results qualified on the basis of internal standard recoveries.

2.2.7 Post-Digestion Spike Recovery (Metals only)

The analyte recoveries obtained for post-digestion spike analyses were compared to the acceptance range for accuracy in the analytical method. Under some circumstances, laboratories will quantify results by the method of standard additions to compensate for low post-digestion spike recovery. As such, the low spike recovery would not indicate poor accuracy. However, if the result for the sample on which the post-digestion spike analysis was performed was not obtained by the method of standard additions and the post-digestion spike recovery was outside of the acceptance limits, the result for the sample on which the post-digestion spike was run were qualified based on the following guidance:

- If the recovery was above the upper acceptance limit, detectable results were qualified as estimated ("J") No action was taken for nondetects
- If the recovery was below the lower acceptance limit but $\geq 30\%$, detectable and nondetectable results were qualified as estimated ("J/UJ")
- If the recovery was $< 30\%$, detectable results were qualified as estimated ("J") and nondetectable results were rejected ("R")

The data reviewer used professional judgment in conjunction with other QC sample results, such as MS recoveries to determine the need for qualification of results for other samples (if any) associated with the post-digestion spike analysis. A qualifier code of 'PDS' was assigned to all results qualified or rejected on the basis of post-digestion recoveries.

2.2.8 Serial Dilution (Metals only)

ICP serial dilutions were run to help evaluate whether or not significant physical or chemical interferences exist due to sample matrix. When analyte concentrations were sufficiently high (the concentration in the original sample is minimally a factor of 50 above the IDL) the results obtained for a five fold-dilution of the original sample were compared to the original results by means of a percent difference (%D). The %D was compared to a precision acceptance limit of $\pm 15\%$. If the absolute value of the percent difference between the diluted and original result was greater than 15%, all results for that analyte in that sample delivery group (SDG) were qualified as estimated ("J/UJ"). Generally the diluted result can be considered to be the more accurate result, as long as the diluted concentration was well above the detection limit. Therefore, the data reviewer can generally discern a potential bias direction from a comparison of the diluted and undiluted results.

A qualifier code of 'DL' was assigned to all results qualified on the basis of serial dilution results.

2.2.9 Surrogate Recoveries

The surrogate recoveries obtained for each sample analysis for which surrogates were analyzed were compared to the laboratory historical limits. Results for analytes in the sample associated with surrogate recoveries outside the acceptance range were qualified as follows:

- If the surrogate recovery was greater than the upper acceptance limit for any surrogate (for semivolatile organics by GC/MS, two or more surrogates in either fraction must be high), suggesting a potential high bias in reported results, all positive results for associated analytes in that sample were qualified as estimated ("J"), whereas nondetect results were considered to be acceptable for use without qualification.
- If the surrogate recovery was less than the lower acceptance limit but $> 10\%$ (for semivolatile organics by GC/MS, two or more surrogates in either fraction were out with at least one of them being less than the lower limit but $> 10\%$), suggesting a potential low bias in reported results, positive and nondetect results for associated analytes in that sample were qualified as estimated ("J" or "UJ").

- If any surrogate recovery was <10%, positive results for associated analytes in that sample were qualified as estimated ("J") whereas associated nondetect results were qualified as unusable ("R")

A qualifier code of "SUR" was assigned to all results qualified as estimated or unusable on the basis of surrogate recoveries

2.2.10 Field Duplicate Results

Criteria for evaluating field duplicate results were not provided in the EPA Functional Guidelines. Therefore, the criteria in Table 3-1 of the DCQAP were used for validation of homogenized or collocated field duplicate results for all analyses. If the criteria were not met for an analyte, all associated sample data for that analyte were qualified as estimated (J/UJ)

A qualifier code of "FD" was assigned to all results qualified on the basis of field duplicate results

2.2.11 Anion/Cation Balance

Since water is generally electrically neutral, the sum of the dissolved cation concentrations (expressed in milli-equivalents per liter) should equal the sum of the dissolved anion concentrations. For projects in which the major cations and anions were analyzed, the data reviewer should evaluate whether there was an acceptable balance between anion concentrations and cation concentrations. It should be noted that major cations and anions must both be analyzed to complete the anion/cation balance. In accordance with Standard Methods #1030F, the equation used to calculate anion-cation balances is

$$\text{Percent difference} = 100 \times (\text{Concentrations of cations} - \text{Concentrations of anions}) / (\text{Concentrations of cations} + \text{Concentrations of anions})$$

Laboratory accuracy control limits for most analytes for this project are $\pm 30\%$. This level of accuracy is considered to be fully acceptable in meeting the end use objectives of ground water monitoring. A 30% bias in the metals analysis corresponds to an anion-cation balance percent difference of approximately 13%. Therefore, since a 30% bias is considered not to adversely affect the usability of the data, an evaluation criterion of a percent difference less than $\pm 13\%$ was utilized for anion-cation balance evaluation. If the anion/cation balance was greater than $\pm 13\%$, the data reviewer used professional judgment to discern likely causes of the imbalance and need for qualification of data.

2.2.12 Balance of Total to Partial Analyses

Results for the total analysis of a particular analyte should be greater than the results for a partial analysis of that analyte. For example, the results for total metals should be greater than or equal to the results for dissolved metals, and Ammonia as N concentrations should not be greater than Total Kjeldahl Nitrogen concentrations. Because all results were limited by the accuracy of the analysis, the criteria for accuracy of the analysis were used as the basis for criteria to evaluate the agreement between the results for the partial analysis and the total portion. Where both of the results were greater than five times the higher RL, the criterion utilized was that the two values

should agree within $\pm 30\%$. For example, the partial analysis result should not be more than 30% higher than the total analysis result. Where either of the results was less than five times the RL, an evaluation criterion of plus or minus two-times the higher RL was compared against the difference between the partial and total results. If the results for the partial versus total analyses did not satisfy the appropriate evaluation criterion, results for the partial and total analyses were qualified as estimated ("J/UJ").

2.2.13 Reporting of Isomer Totals (VOCs only)

Total xylenes and 1,2-DCE results were calculated and reported by the laboratory as described in the SWMU South of 400 North Data Validation Report dated November 2007.

SECTION THREE

Data Validation Narrative TESTAMERICA-Denver Data Package 280-7468

The results for analyses of the samples for the Parish Chemical 2010 Sampling Event collected at Geneva Steel were reported by TestAmerica in one data package. The subsections below present the results of the data validation for the data package. Validation results based on MS/MSD, field duplicate, field blank, and equipment blank analyses are present in Section 4.

Data package 280-7269 contained the analytical results for ten groundwater samples, one groundwater field duplicate sample, one field blank sample, and one trip blank sample. The table below lists the sample included in this data package, the corresponding laboratory identifications (IDs), the analyses performed, and any QC sample designations.

Field ID	Laboratory ID	Analyses	QC Designations
PC 223	280 7468-1	SVOCs	
PC 219	280 7468-2	SVOCs	
FB-091510	280 7468 3	SVOCs VOCs	Field Blank
PC-9213	280 7468 4	SVOCs VOCs	FD of PC 213
PC-213	280 7468 5	SVOCs VOCs	MS/MSD – SVOC VOC
GPW 0180	280 7468 6	SVOCs	
PC-205	280 7468 7	SVOCs	
PC 206	280 7468 8	SVOCs	
PC 210	280 7468 9	SVOCs	
PC-228	280 7468 10	SVOCs	
PC 229A	280 7468 11	SVOCs	
PC 230	280 7468-12	SVOCs	
TRIP BLANK (091510)	280-7468 13	VOCs	Trip Blank

FD – Field Duplicate

SVOCs – Semivolatile Organic Compounds

MS/MSD – Matrix Spike/Matrix Spike Duplicate

VOCs – Volatile Organic Compounds

3.1 Overall Assessment

With the exception of the hexachlorocyclopentadiene and 3 & 4 methylphenol result for all samples reported as non-detect, which were qualified as unusable due to LCS/LCSD and MS/MSD recoveries, respectively, the data reported in this data package are considered usable as qualified.

3.2 Notes from Case Narrative

The laboratory noted several analytical issues in the case narrative. Provided below are the items listed in the laboratory case narrative that are not described in the review below and a summary of the effect on data and its usability.

- VOCs by SW8260B – The original analyses of samples PC-9213 and PC-213 were diluted at 4X dilutions prior to the initial analyses due to possible matrix interference and/or high concentration of target analytes. These samples were also re-analyzed 40X dilutions due to a high concentration of ethylbenzene above the calibration level. Only the ethylbenzene results that exceeded the calibration range in the original analysis were selected for reporting from the re-analysis. The remaining analytes were selected for reporting from the original analysis. The reporting limits have been adjusted accordingly. All analytes reported as non-

SECTION THREE

Data Validation Narrative

TESTAMERICA-Denver Data Package 288-7468

detects within these samples were reported at elevated reporting limits and will need to be evaluated by the end user of the data to determine if the results are considered usable for meeting project objectives

3.3 COC and Sample Receipt

The samples were shipped to TestAmerica under chain-of-custody (COC). The cooler temperatures upon receipt were 4.1 degrees Celsius (°C), 3.6 °C, and 3.4 °C, within the recommended ≤6°C temperature range. Ice was present in the coolers. All samples were received intact. Data qualification was not necessary on the basis of sample receipt and COC.

3.4 Holding Times

Analyses were conducted within the holding time requirements. Data qualification was not required.

3.5 Blanks

Method Blanks and Calibration Blanks

No target analytes were reported as detected in the method blanks. Data qualification was not required.

Trip Blanks

One trip blank, TRIP BLANK sent on 09/15/10, was reported in this data package. Methylene chloride was reported as detected within the trip blank at a concentration of 0.46 µg/L. The methylene chloride results for samples PC-9213 and PC-213 were qualified as non-detect (U TB-1).

Field Blank

One field blank, FB-091510, was reported in this data package. Benzol alcohol was reported as detected in the field blank at a concentration of 0.22 µg/L. A collective assessment was conducted on the field blank results and is presented in Section 4.

3.6 Laboratory Control Sample

With the exception listed below, the LCS recoveries were within the DCQAP specified acceptance ranges.

For the SVOC analysis of preparation batch 280-32420, the LCS and LCSD recoveries for hexachlorocyclopentadiene were outside the control criteria limits of 10-120% with recoveries of 9% and 7%, respectively. The RPD between the LCS and LCSD was within the control limits of 72% with a RPD of 15%. Since the site specific MS (24%) and MSD (20%) were within the control limits (see Section 4.1 and Attachment 1), indicating acceptable accuracy was attained for the method and site matrix, rejection of field data was not required. The hexachlorocyclopentadiene results for all site samples were qualified as estimated, UJ LCS-L, to reflect the potential low bias. The hexachlorocyclopentadiene results for sample FB-091510 was qualified as unusable, R LCS.

SECTION THREE

Data Validation Narrative TESTAMERICA-Denver Data Package 288-7468

3.7 Surrogate Recoveries

With the exceptions described below, recoveries for the surrogate compounds in field samples analyzed for VOCs and SVOCs were within laboratory-determined acceptance limits.

The method blank for batch 280-32420 exhibited surrogate recoveries outside of acceptance limits. The following table summarizes the outlying surrogate recoveries and resultant data qualification.

Surrogate	Recovery (%)	Acceptance Range (%)	Data Qualification
Groundwater Batch 280-32420			
Method Blank			
2 Fluorobiphenyl	35	38-120	None. Two of the three base/neutral fraction surrogates were within the acceptance limits and qualification of data based on QC sample surrogate outliers is not required.

The following four subsections present a discussion on the MS/MSD analyses, field duplicate analyses, field blank analyses, and equipment blank analyses associated with the samples collected during the Parish Chemical 2010 Sampling Event

4.1 MATRIX SPIKE ANALYSES

The site-specific MS results were assessed collectively to evaluate potentially systematic matrix effects and to determine the need for qualification of sample results of similar matrix

The table below lists the site-samples that were used to prepare matrix spike samples. As a minimum of one MS set was requested for each analytical method performed for this sampling event, the DCQAP frequency for matrix QC samples (5% per analysis method) was satisfied

Sample ID	Data Package	Analyses
PC 213	280 7468	SVOCs VOCs

SVOCs – Semivolatile Organic Compounds

VOCs – Volatile Organic Compounds

In accordance with SW-846, the laboratory calculated control limits based on historical recoveries. These control limits were used to assess the accuracy of the site-specific sample matrix for the analyses listed in the table above as specified in the DCQAP. For the sample results that were greater than four times the spike amount, the MS and MSD results were not appropriate for assessing accuracy and precision. For the MS/MSD results that were diluted due to high analyte concentrations or matrix interference, the MS and MSD results were not appropriate for assessing accuracy and precision.

In general, if less than 35% of the valid spike recoveries for a given analyte were outside of the acceptance range, only the parent sample results were qualified as estimated. Data qualification was not assigned if the potential biases were high and the results were non-detect. In general, if more than 35% of the valid spike recoveries for a given analyte were outside of the acceptance range, the results for that analyte in all samples of the same matrix were considered for data qualification. However, qualification of associated sample results in the batch, data package, or sampling event was not performed on the basis of matrix spike recoveries alone. The data reviewer used professional judgment and considered the results of other QC measures such as LCS and surrogate recoveries in conjunction with MS/MSD results for other batches to determine the need for qualification of associated samples.

The MS/MSD recoveries and RPDs for all site-specific samples collected in association with this sampling event are presented in Attachment 1. The table below presents a summary of only those results that did not meet the acceptance criterion described above, as well as any resultant data qualification. Attachment 1 presents the statistics and details that resulted in data qualification. The following data qualifications were issued:

- If the MS/MSD recoveries were below the acceptance limits, results were qualified as estimated (J/UJ) to reflect the potential low bias.
- If the MS/MSD recoveries were above the acceptance limits, detectable results were qualified as estimated (J) to reflect the potential high bias. Data qualification was not issued to non-detect results.

- If the MS/MSD recoveries were below 10% for organic compounds or below 30% for inorganic compounds, non-detect results were qualified as unusable (R) and detect results were qualified as estimated (J) to reflect the potential low bias
- If the RPD between the MS/MSD results exceeded the acceptance limit, results were qualified as estimated (J/UJ) with an indeterminate bias

Analyte	Resultant Data Qualification
VOCs (1 01-040)	
1 1-Dichloroethane	The listed analytical results for all groundwater samples were qualified as estimated (J) to reflect the potential low bias indicated by the MS/MSD recoveries
Benzene	
Methylene chloride	
trans 1 3-Dichloropropene	
1 2 3 Trichlorobenzene	None The listed analytical results in the associated samples were reported as non detect and the potential bias indicated by the MS/MSD recoveries is considered to be high
1 2 4 Trichlorobenzene	
1 2-Dichloroethane	
Bromoform	
SVOCs (1 01 040)	
3 & 4 Methylphenol	The 3 & 4 methylphenol results for all samples reported as non detect were qualified as unusable (R) The 3 & 4 methylphenol results for all samples reported as detected were qualified as estimated (J) to reflect the potential low bias
bis(2 Chloroethyl) ether	The bis(2 chloroethyl) ether results for all samples were qualified as estimated (J) to reflect the potential high bias indicated by the MS/MSD recoveries

All other MS/MSD recoveries were within the acceptance limits Therefore further data qualification was not considered necessary

All the relative percent differences (RPDs) between MS and MSD results for chemistry target analytes contained in the spiking solutions used by the laboratory were within acceptance limits indicating acceptable method precision and sample matrix precision

4.2 FIELD DUPLICATE ANALYSES

One field duplicate sample was collected during this sampling event The field duplicate pairs were PC-213 / PC-9213 analyzed for VOCs and SVOCs The field duplicate pair collected for this sampling event satisfied the DCQAP frequency for field duplicate samples (10% per analysis method) With the exception of the SVOCs listed in the table below, field duplicate results satisfied the applicable evaluation criteria listed in Section 2 For the analytes listed in the table as not meeting evaluation criteria with less than 35% for a given analyte outside of the acceptance range, only the parent sample results were qualified as estimated For analytes listed in the table as not meeting the evaluation criteria with over 35% for a given analyte outside the acceptance range, qualification was extended to all samples

SECTION FOUR

Site-Specific Quality Control Assessment

Field Duplicate Pair	Analyte	Parent Result	Field Duplicate Result	Criteria	Data Qualification
Groundwater					
PC 213 / PC 9213	Bis(2 chloroethyl) ether	160 µg/L	76 µg/L	RPD >30% (71%)	The Bis(2 chloroethyl) ether results for all groundwater samples were qualified as estimated (J) with an indeterminate bias

4 3 FIELD BLANK ANALYSES

One field blank (FB-091510) was collected in association with this sampling event and analyzed for the VOCs and SVOCs parameters. The field blanks collected for this sampling event satisfied the DCQAP frequency for field blank sample (5% per analysis method).

If an analyte was present in the field blank, all associated sample results within five times the highest blank concentration for that analyte (ten times for acetone) were qualified as non-detect (U) at the reporting limit or reported value. The table below illustrates the analytes detected in the field blanks, the concentrations and the resultant data qualifications.

Field ID	Analyte	Concentration (µg/L)	Qualifications
FB 091510	Benzol alcohol	0.22	The benzol alcohol results for all sample reported at a concentration less than five times the blank contamination (1.1 µg/L) were qualified as non detect at the reporting limit.

4 4 EQUIPMENT BLANK ANALYSES

An equipment blank was not collected with this sampling event because the water samples were collected using dedicated sampling equipment.

With the exception of the hexachlorocyclopentadiene for samples FB-091510 and 3 & 4 methylphenol result for all samples reported as non-detect, the Parish Chemical 2010 Groundwater Sampling Event groundwater data are considered usable, as qualified. A general overall assessment of data quality assurance objectives is provided below.

5.1 PRECISION

Precision is a measure of mutual agreement among replicate (or between duplicate) or co-located sample measurements of the same analyte. The closer the numerical values of the measurements are to each other, the more precise the measurement. Precision for a single analyte was expressed as a RPD or absolute difference between field duplicate results, LCS, LCSD, and MS and MSD results.

All the LCS/LCSD and MS/MSD results for VOCs and SVOCs analyses satisfied the precision evaluation criteria. No data were qualified as unusable on the basis of LCS to LCSD or MS to MSD precision. As such, the overall level of precision demonstrated by the analyses and with respect to the site-specific sample matrix is considered acceptable.

Precision of sampling and analyses was evaluated by the comparison of field duplicate results. One field duplicate sample was collected during this sampling event. With the exceptions described in Section 4.2, the field duplicate results satisfied the precision evaluation criteria. Data were not qualified as unusable on the basis of field duplicate precision. As such, the field duplicate sample results are indicative of satisfactory sampling and analysis precision and satisfactory representativeness of the samples to the medium sampled.

5.2 ACCURACY

Accuracy is a measure of bias in a measurement system. The closer the value of the measurement agrees with the true value, the more accurate the measurement. This was expressed as the percent recovery of surrogates and of target analytes in LCS/LCSDs and MS/MSDs.

With the exception discussed in Section 3.6, LCS/LCSD recoveries were within the DCQAP specified acceptance ranges. All surrogate recoveries associated with field samples were within laboratory-determined acceptance limits. With the exception discussed in Section 4.1, all the MS/MSD results for VOCs and SVOCs, analyses satisfied the accuracy evaluation criteria.

As such, the overall level of accuracy demonstrated by the analyses and with respect to the site-specific sample matrix is considered acceptable.

5.3 REPRESENTATIVENESS

Representativeness is the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. The design of, and rationale for, the sampling program (in terms of the purpose for sampling, selecting the sampling locations, the number of samples to be collected, the ambient conditions for sample collection, the frequencies and timing for sampling, and the sampling techniques) assures that the environmental condition has been sufficiently represented. Representativeness

was maintained during the sampling effort by completing all sampling using similar sampling procedures

5.4 COMPLETENESS

Completeness is defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis. With the exception of the hexachlorocyclopentadiene for sample FB-091510 and 3 & 4 methylphenol result for all samples reported as non-detect, results were considered usable for meeting project objectives. As such, the overall analytical completeness is >99%, satisfying the overall completeness goal for investigative activities of 80% for each sampling event.

5.5 COMPARABILITY

Comparability expresses the confidence with which one data set can be compared to another. Comparability can be related to accuracy and precision because these quantities are measures of data reliability. Data are comparable if collection techniques, measurement procedures, method and reporting are equivalent for the samples within a sample set. To maximize comparability, all samples covered by this report were collected and analyzed in accordance with prescribed quality assurance and quality control measures. As acceptable levels of overall accuracy and precision were attained, the reporting and analyses of the data within these data packages are considered comparable to one another.

5.6 SENSITIVITY

RLs are established by the analytical laboratory based on the MDLs, historical data, and comparison to EPA limits for the respective methods.

The laboratory reported positive results between the MDL and the RL. To reflect the higher degree of uncertainty associated with values reported between the MDL and RL, these results were qualified as estimated ("J"). A qualifier code of SQL denoting sample quantitation limit was assigned to results qualified for this reason.

The TestAmerica-Denver RLs met or were lower than (higher sensitivity) the maximum laboratory RLs specified in the DCQAP with the exceptions noted below.

Samples PC-9213 and PC-213 were analyzed at higher dilutions for VOCs analyses due to high constituent concentrations or matrix interferences. Samples with elevated reporting limits are described in the Notes from the Case Narrative Section from the data validation narrative. Any results that were reported as non-detect at elevated RLs will need to be evaluated by the end user of the data to determine if these results are considered usable for meeting project objectives.

**MS/MSD Collective Assessment for the
Sept 2010 Parish Chemical Sampling Event**

Groundwater Samples

Method 8260B		Sample ID		PC-213		Total number of %Rs below the lower Limit	Total number of %Rs above the upper limit	Total Number of applicable MS/MSD Results	Percent of MS/MSD %Rs outside acceptance range	Average MS/MSD %R
Analyte	%R Criteria Range	RPD Control Limit (%)	MS (%R)	MSD (%R)	RPD					
1,1,1,2-Tetrachloroethane	77-120	20	96	101	5	0	0	2	0.0	98.5
1,1,1-Trichloroethane	78-120	20	102	109	7	0	0	2	0.0	105.5
1,1,2,2-Tetrachloroethane	73-120	20	88	93	5	0	0	2	0.0	90.5
1,1,2-Trichloroethane	76-120	21	100	103	3	0	0	2	0.0	101.5
1,1-Dichloroethane	77-120	21	76	81	6	1	0	2	50.0	78.5
1,1-Dichloroethene	68-133	20	79	86	8	0	0	2	0.0	82.5
1,1-Dichloropropene	75-120	21	87	95	9	0	0	2	0.0	91.0
1,2,3-Trichlorobenzene	66-123	29	116	124	7	0	1	2	50.0	120.0
1,2,3-Trichloropropane	72-120	23	86	93	8	0	0	2	0.0	89.5
1,2,4-Trichlorobenzene	73-121	25	115	126	9	0	1	2	50.0	120.5
1,2,4-Trimethylbenzene	77-120	20	91	98	8	0	0	2	0.0	94.5
1,2-Dibromo-3-chloropropane (DBCP)	65-120	22	93	100	6	0	0	2	0.0	96.5
1,2-Dibromoethane (EDB)	77-120	20	96	101	5	0	0	2	0.0	98.5
1,2-Dichlorobenzene	76-120	20	92	97	5	0	0	2	0.0	94.5
1,2-Dichloroethane	74-120	20	115	121	5	0	1	2	50.0	118.0
1,2-Dichloroethene (total)	78-120	20	87	92	6	0	0	2	0.0	89.5
1,2-Dichloropropane	76-120	20	87	94	8	0	0	2	0.0	90.5
1,3,5-Trimethylbenzene	77-120	20	89	97	9	0	0	2	0.0	93.0
1,3-Dichlorobenzene	75-120	20	92	101	9	0	0	2	0.0	96.5
1,3-Dichloropropane	75-120	20	90	94	4	0	0	2	0.0	92.0
1,4-Dichlorobenzene	77-120	23	86	98	13	0	0	2	0.0	92.0
2,2-Dichloropropane	72-128	24	89	95	6	0	0	2	0.0	92.0
2-Butanone (MEK)	57-120	32	84	91	8	0	0	2	0.0	87.5
2-Chlorotoluene	76-120	20	89	97	9	0	0	2	0.0	93.0
2-Hexanone	57-121	25	89	97	8	0	0	2	0.0	93.0
4-Chlorotoluene	78-120	20	84	94	10	0	0	2	0.0	89.0
4-Isopropyltoluene	76-120	20	85	92	8	0	0	2	0.0	88.5
4-Methyl-2-Pentanone (MIBK)	65-120	22	106	109	3	0	0	2	0.0	107.5
Acetone	48-130	41	72	75	4	0	0	2	0.0	73.5
Benzene	77-120	20	49	55	6	2	0	2	100.0	52.0
Bromobenzene	75-120	20	97	103	6	0	0	2	0.0	100.0
Bromochloromethane	78-120	20	93	98	5	0	0	2	0.0	95.5
Bromodichloromethane	78-120	20	96	100	4	0	0	2	0.0	98.0
Bromoform	74-121	21	115	125	8	0	1	2	50.0	120.0
Bromomethane	42-154	24	77	76	3	0	0	2	0.0	76.5
Carbon tetrachloride	80-120	21	101	107	6	0	0	2	0.0	104.0
Chlorobenzene	78-120	20	97	103	5	0	0	2	0.0	100.0
Chloroethane	51-133	25	74	69	8	0	0	2	0.0	71.5
Chloroform	78-120	20	97	103	7	0	0	2	0.0	100.0
Chloromethane	46-142	24	68	60	13	0	0	2	0.0	64.0
cis-1,2-Dichloroethene	75-120	20	94	101	7	0	0	2	0.0	97.5
cis-1,3-Dichloropropene	76-120	20	88	92	5	0	0	2	0.0	90.0
Dibromochloromethane	76-120	20	95	100	6	0	0	2	0.0	97.5
Dibromomethane	77-120	20	99	105	6	0	0	2	0.0	102.0
Dichlorodifluoromethane	56-140	24	86	75	14	0	0	2	0.0	80.5
Ethylbenzene	78-120	26	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	73-123	25	96	106	10	0	0	2	0.0	101.0
Isopropylbenzene	71-120	20	94	102	8	0	0	2	0.0	98.0
Methyl tert-Butyl Ether (MTBE)	58-120	21	95	97	2	0	0	2	0.0	96.0
Methylene chloride	71-120	20	68	70	2	2	0	2	100.0	69.0
m-Xylene & p-Xylene	78-120	20	96	100	3	0	0	2	0.0	98.0
Naphthalene	62-121	32	86	100	14	0	0	2	0.0	93.0
n-Butylbenzene	76-120	21	82	90	9	0	0	2	0.0	86.0
n-Propylbenzene	76-120	20	85	92	8	0	0	2	0.0	88.5
o-Xylene	77-120	20	93	101	9	0	0	2	0.0	97.0
sec-Butylbenzene	80-120	21	83	91	9	0	0	2	0.0	87.0
Styrene	77-120	20	93	98	6	0	0	2	0.0	95.5
tert-Butylbenzene	76-120	21	90	98	8	0	0	2	0.0	94.0
Tetrachloroethene	77-120	20	102	109	7	0	0	2	0.0	105.5
Toluene	73-120	20	92	99	7	0	0	2	0.0	95.5
trans-1,2-Dichloroethene	80-120	24	79	83	6	1	0	2	50.0	81.0
trans-1,3-Dichloropropene	72-120	20	98	106	8	0	0	2	0.0	102.0
Trichloroethene	78-122	20	99	105	6	0	0	2	0.0	102.0
Trichlorofluoromethane	63-135	20	94	82	14	0	0	2	0.0	88.0
Vinyl chloride	49-136	24	73	65	12	0	0	2	0.0	69.0
Xylenes (total)	77-120	20	95	100	5	0	0	2	0.0	97.5

NA = Not Applicable because parent sample result was greater than four times the spike amount added

Below the lower limit of the acceptance range

Above the upper limit of the acceptance range

RPD between the MS and MSD results exceeded the criterion

More than 35% of the applicable MS/MSD recoveries were outside the acceptance range

Recovery is less than 10% for organic and 30% for inorganics

**MS/MSD Collective Assessment for the
Sept 2010 Parish Chemical Sampling Event**

Groundwater Samples

Method 8270C		Sample ID	PC-213			Total number of %Rs below the lower Limit	Total number of %Rs above the upper limit	Total Number of applicable MS/MSD Results	Percent of MS/MSD %Rs outside acceptance range	Average MS/MSD %R
Analyte	%R Criteria Range	RPD Control Limit (%)	MS (%R)	MSD (%R)	RPD					
1,2,4-Trichlorobenzene	23-120	42	74	77	5.2	0	0	2	0.0	75.5
2,4,5-Trichlorophenol	60-120	30	100	101	1.6	0	0	2	0.0	100.5
2,4,6-Trichlorophenol	52-120	30	97	94	1.9	0	0	2	0.0	95.5
2,4-Dichlorophenol	59-120	30	90	91	1.5	0	0	2	0.0	90.5
2,4-Dimethylphenol	30-120	30	78	76	0.9	0	0	2	0.0	77.0
2,4-Dinitrophenol	30-136	49	102	96	5.0	0	0	2	0.0	99.0
2,4-Dinitrotoluene	51-120	32	97	99	2.5	0	0	2	0.0	98.0
2,6-Dinitrotoluene	52-125	30	93	95	2.7	0	0	2	0.0	94.0
2-Chloronaphthalene	39-120	30	90	93	3.8	0	0	2	0.0	91.5
2-Chlorophenol	57-120	30	82	84	2.9	0	0	2	0.0	83.0
2-Methylnaphthalene	32-120	32	83	87	5.7	0	0	2	0.0	85.0
2-Methylphenol	50-120	30	85	85	0.3	0	0	2	0.0	85.0
2-Nitroaniline	44-120	30	99	99	1.3	0	0	2	0.0	99.0
2-Nitrophenol	51-120	30	83	89	6.8	0	0	2	0.0	86.0
3,3'-Dichlorobenzidine	54-120	30	88	88	0.4	0	0	2	0.0	88.0
3-Methylphenol & 4-Methylphenol	14-120	30	0	0	0.0	2	0	2	100.0	0.0
3-Nitroaniline	49-120	35	78	80	3.1	0	0	2	0.0	79.0
4,6-Dinitro-2-methylphenol	37-126	37	97	91	6.1	0	0	2	0.0	94.0
4-Bromophenyl phenyl ether	52-120	31	101	100	0.6	0	0	2	0.0	100.5
4-Chloro-3-methylphenol	63-120	30	95	98	3.8	0	0	2	0.0	96.5
4-Chloroaniline	52-120	54	78	77	0.8	0	0	2	0.0	77.5
4-Chlorophenyl phenyl ether	56-120	30	95	97	2.8	0	0	2	0.0	96.0
4-Nitroaniline	39-120	34	71	69	2.2	0	0	2	0.0	70.0
4-Nitrophenol	49-124	35	106	104	1.3	0	0	2	0.0	105.0
Acenaphthene	45-120	30	91	94	4.0	0	0	2	0.0	92.5
Acenaphthylene	50-120	30	88	90	3.0	0	0	2	0.0	89.0
Aniline	10-120	30	66	66	0.8	0	0	2	0.0	66.0
Anthracene	56-120	30	95	94	0.4	0	0	2	0.0	94.5
Benzo(a)anthracene	54-120	30	96	87	8.7	0	0	2	0.0	91.5
Benzo(a)pyrene	52-120	30	87	77	10.7	0	0	2	0.0	82.0
Benzo(b)fluoranthene	57-120	38	100	92	8.5	0	0	2	0.0	96.0
Benzo(ghi)perylene	53-120	30	97	85	12.7	0	0	2	0.0	91.0
Benzo(k)fluoranthene	52-120	37	91	80	12.2	0	0	2	0.0	85.5
Benzyl alcohol	55-120	30	85	90	6.3	0	0	2	0.0	87.5
bis(2-Chloroethoxy)methane	52-120	30	85	89	5.0	0	0	2	0.0	87.0
bis(2-Chloroethyl) ether	49-120	34	405	264	26.2	0	2	2	100.0	334.5
bis(2-Ethylhexyl) phthalate	48-120	30	97	85	12.2	0	0	2	0.0	91.0
Butyl benzyl phthalate	55-120	30	102	92	9.5	0	0	2	0.0	97.0
Chrysene	56-120	30	96	86	10.9	0	0	2	0.0	91.0
Dibenz(a,h)anthracene	54-120	30	84	76	8.7	0	0	2	0.0	80.0
Dibenzofuran	58-120	30	93	94	1.6	0	0	2	0.0	93.5
Diethyl phthalate	50-120	30	103	102	0.5	0	0	2	0.0	102.5
Dimethyl phthalate	61-120	30	98	99	1.7	0	0	2	0.0	98.5
Di-n-octyl phthalate	47-120	30	95	85	10.0	0	0	2	0.0	90.0
Fluoranthene	49-120	34	103	99	3.8	0	0	2	0.0	101.0
Fluorene	57-120	30	98	98	0.9	0	0	2	0.0	98.0
Hexachlorobenzene	50-120	30	102	98	3.4	0	0	2	0.0	100.0
Hexachlorocyclopentadiene	10-120	72	24	20	16.3	0	0	2	0.0	22.0
Hexachloroethane	21-120	57	62	67	7.5	0	0	2	0.0	64.5
Indeno(1,2,3-cd)pyrene	56-120	30	101	88	12.4	0	0	2	0.0	94.5
Isophorone	51-120	30	89	90	2.3	0	0	2	0.0	89.5
Naphthalene	33-120	30	81	84	3.8	0	0	2	0.0	82.5
Nitrobenzene	58-120	30	97	102	6.0	0	0	2	0.0	99.5
N-Nitrosodimethylamine	48-120	43	84	88	6.2	0	0	2	0.0	86.0
N-Nitrosodi-n-propylamine	50-120	30	88	90	3.0	0	0	2	0.0	89.0
N-Nitrosodiphenylamine	58-120	37	105	105	0.3	0	0	2	0.0	105.0
Pentachlorophenol	40-120	33	104	103	0.5	0	0	2	0.0	103.5
Phenanthrene	52-120	30	100	100	0.5	0	0	2	0.0	100.0
Phenol	52-120	42	86	90	2.8	0	0	2	0.0	89.0
Pyrene	56-120	30	102	96	5.0	0	0	2	0.0	99.0
Pyridine	24-120	38	81	85	4.7	0	0	2	0.0	83.0

Below the lower limit of the acceptance range

Above the upper limit of the acceptance range

RPD between the MS and MSD results exceeded the criterion

More than 35% of the applicable MS/MSD recoveries were outside the acceptance range

Recovery is less than 10% for organic and 30% for inorganics

Appendix C

Laboratory Analytical Reports with Chain of Custody Records and Data Qualifiers

(Appendix C is provided in electronic format on the disc behind this page)